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### REMARKS

In the Office Action, the Examiner noted that claims 1-22 are pending in the application and that claims 1-22 stand rejected. By this response, claims 1, 15, 17 and 22 are amended to more clearly define the Applicant's invention and not in response to prior art, and all other claims continue un-amended.

In view of the above amendments and the following discussion, the Applicants respectfully submit that none of these claims now pending in the application is obvious under the provisions of 35 U.S.C. § 103. Thus the Applicant believes that all of these claims are now in allowable form.

### Rejections

#### A. 35 U.S.C. § 103

The Examiner rejected claims 1-2, 4-7, 11 and 22 under 35 U.S.C. § 103(a) as being unpatentable over Hamel et al. (U.S. Patent 5,943,148, hereinafter "Hamel") in view of Armitage et al. ("Design of a Survivable WDM Photonic Network", hereinafter "Armitage") and Sharma et al. (U.S. Patent 5,717,795, hereinafter "Sharma"). The rejection is respectfully traversed.

The Examiner alleges that regarding claim 1, Hamel discloses all of the aspects of the Applicant's invention except that Hamel does not expressly disclose that the tributary subsystems are configured to be coupled to pluralities of devices to enable the devices to communicate over the ring network. The Examiner also correctly concedes that Hamel does not disclose that multiplexing subsystems channel signals between the pluralities of devices and the ring network and that the module comprises an integral cross-connect module, and the determining is based on address information included in the received signals. However, the Examiner alleges that it is well known and conventional in the art that the tributary subsystems of Hamel would be configured to be coupled to pluralities of devices to enable the devices to communicate over the ring network. The Applicant respectfully disagrees.

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The Examiner further alleges that Armitage discloses an integral cross-connect module and that it would have been obvious to a person of ordinary skill in the art to implement the cross-connect module of Armitage as the module of the system of Sharma. The Applicant respectfully disagrees.

The Examiner further alleges that Sharma discloses an integral cross-connect module and said determining based on address information and that it would have been obvious to a person of ordinary skill in the art to implement the cross-connect module of Sharma in the system of Hamel in view of Armitage. The Applicant respectfully disagrees.

The Applicant submits that the teachings of Hamel fail to teach, suggest or disclose the invention of the Applicant at least with respect to independent claim 1, which specifically recites:

"A system for communicating between a plurality of nodes coupled to an optical wavelength division multiplexed ring network comprising:

a first terminal node having a communication subsystem configured to be coupled to the ring network to receive and to transmit signals at a first wavelength and to permit signals at other wavelengths to pass, a tributary subsystem configured to be coupled to a plurality of devices to enable the devices to communicate over the ring network, and a multiplexing subsystem coupled to the tributary subsystem and to the communication subsystem to channel signals between the plurality of devices and the ring network;

a second terminal node having a communication subsystem configured to be coupled to the ring network to receive and to transmit signals at a second wavelength and to permit signals at other wavelengths to pass, a tributary subsystem configured to be coupled to a plurality of devices to enable the devices to communicate over the ring network, and a multiplexing subsystem coupled to the tributary subsystem and to the communication subsystem to channel signals between the plurality of devices and the ring network; and

a head-end coupled to the ring network to receive and to transmit signals at both the first and second wavelengths, the head-end node having a demultiplexer to isolate signals received at the first and second wavelengths, an integral cross-connect module to determine an output wavelength at which to transmit received signals based on address information included in the received signals, and a multiplexer to combine the received signals for transmission on the ring network at the first and second wavelengths;

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wherein said first terminal node and said second terminal node communicate with each other only through said head-end node via respective separate communication channels." (emphasis added).

In support of at least claim 1, the Applicant in the Specification specifically recites:

"As discussed in more detail below, head-end and terminal nodes 24, 26 provide for coupling client system (not shown) to ring 22 for communication over virtual star network 20. Each terminal node 26 has a separate communication channel 28 over network 20 to head-end 25 but does not have a direct communication channel to any other terminal node 26. Each terminal node 26 sends all network traffic from its connected client systems to head-end node 24, which effects a cross-connection function and sends to each terminal node 26 the network traffic intended for it. Network 20 thus implements a virtual star over a physical ring, with head-end node 24 as the star's logical center, or hub, and terminal nodes 26 as the star's logical points." (See Specification, page 8, lines 15-23).

Transition of a SONET/SDH ring 22 to a virtual star, switched architecture improves the cost-effectiveness and network capacity of an optical ring network. For example, with a conventional OC-48 ring, each node on the ring requires an OC-48 ADM. Each such ADM must be able to handle the full bandwidth of the ring and must be able to drop and to add tributaries into this high-speed channel. The aggregate bandwidth available to all nodes on the ring is about 2.5 Gbps, which must be shared among all nodes. It follows that the aggregate rate available to client systems coupled to each node is much else than the ring bandwidth; it is usually limited to about 622 Mbps (OC-12).

An approach based on a switched, virtual star architecture according to the present invention, is as follows. The OC-48 ADM at each node is replaced by an OC-12 terminal multiplexer, provided with an optical subsystem as discussed below that provides the functionality of a terminal node 26 in the virtual star network. A head-end node 24 is provided to terminate all uplinks and downlinks to and from terminal nodes 26 to effect a SONET/SDH cross-connect function for the traffic from the terminals.

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Virtual star network 20 provides the functional behavior of an ADM-based OC-48 ring, but with added benefits. For example, because each terminal node 26 has available to it the full bandwidth for its wavelength, the aggregate rate available to each node in the virtual star is 622 Mbps (OC-12), regardless of the number of nodes in the network. For comparison, in an ADM-based OC-48 ring network of more than 8 nodes, the average capacity available to each node typically is less than 622 Mbps. Network transceiver hardware for terminal nodes 26 in virtual star network 20 is significantly less complex than that of an OC-48 ADM. This is due to the lower rates handled by terminal nodes 26 and the simpler functionality of a SONET terminal multiplexer as compared to an ADM. Less complexity results in lower cost and higher software and hardware reliability.

As evident from at least the sections of the Applicant's specification presented above, the Applicant's invention is directed, at least in part, to a method and system implementing an inventive switched, virtual star network over a physical ring architecture wherein nodes only communicate with each other via a head end node such that each terminal node has available to it the full bandwidth for its operating bandwidth.

In the Final Office Action, the Examiner refers to FIG. 3 and FIG. 8 of Hamel to reject at least the Applicant's claim 1. Specifically, the Examiner alleges that Hamel teaches the communication between the nodes specifically at col. 3, lines 36-52; col. 4, lines 1-3; col. 5 line 50; col. 7, lines 51-54; col. 11, lines 1-2; and col. 14, lines 55-56. However, there is absolutely no teaching, suggestion or description in Hamel for a switched, virtual star network (a system for communication) having at least a first terminal node and a second terminal node "wherein said first terminal node and said second terminal node communicate with each other only through said head-end node via respective separate communication channels" as taught in the Applicant's specification and claimed by at least the Applicant's claim 1. In contrast to the Applicant's invention, Hamel specifically recites:

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"Studies currently being conducted in several telecommunications laboratories propose the introduction of wavelength multiplexing on ring architectures.

In this connection, the following document may be consulted:  
A. Hamel et al., Multilayer add-drop multiplexers in a self-healing WDW ring network, OFC '95 Technical Digest.

The solution which is usually proposed consists in assigning one wavelength per link between two nodes in order to ensure the exchange of the corresponding information on a physical ring support." (See Hamel, col. 3, lines 42-52). (emphasis added).

"Each of the OADMs may be fixed or tunable (for example control voltage or electrical frequency) and several optical technologies may be used, for example multi-dielectric optical fibers or diffraction gratings or photo-inscribed Bragg gratings." (See Hamel, col. 4, lines 23-27)

In Hamel, the embodiment of FIG. 3 teaches a method of communication between a network head and four nodes. Hamel teaches that information from local user areas to the nodes intended for the network head all travel using a respective, separate wavelength for each node. Hamel also teaches that information exchanged between the network head and a specific node also uses a respective, separate wavelength. However, Hamel is silent about how the nodes communicate with each other. From the disclosure of Hamel presented above (specifically the tunable OADM) however, one can determine that the nodes taught in Hamel communicate with each other by configuring information intended for a specific node with a wavelength received by the specific node and as such are capable of communicating directly with each other. As such, the invention of Hamel teaches away from the Applicant's invention. In contrast with Hamel, the Applicant specifically teaches and claims that nodes only communicate with each other through the head-end node. The purpose and advantages of the Applicant's configuration over Hamel was previously described. That is, each terminal node has available to it the full bandwidth for its operating bandwidth. This is not the case in the invention of Hamel or in FIG. 3 described in Hamel.

Even further, there is absolutely no teaching, suggestion or description in Hamel for an integral cross-connect module used to determine an output

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wavelength at which to transmit received signals based on address information included in the received signals as taught in the Specification and claimed by at least the Applicant's claim 1. In the Specification in support of at least claim 1, the Applicant specifically recites:

"According to other aspects of preferred embodiments, the head-end node received and transmits signals using a synchronous optical network communication standard, such as SONET/SDH. A subset of the signals further use a communication protocol, such as ATM or IP, framed by the communication standard. The head-end node includes at least one protocol subsystem to determine address information for the communication protocol, and the head-end node is configured to send signals using the communication protocol to the at least one protocol subsystem." (See Specification, page 3, line 29 through page 4, line 3).

In the portion of the Applicant's Specification presented above, and throughout the Applicant's Specification, the Applicant teaches and claims that an integral cross-connect of a head-end of the Applicant's invention determines an output wavelength at which to transmit received signals based on address information contained in the received signals. In contrast, there is absolutely no teaching, suggestion or description in Hamel for a cross-connect module as taught and claimed by the Applicant's invention. The Examiner specifically cites FIG. 8 in Hamel for teaching the cross-connect module of the Applicant's invention. The Applicant respectfully submits however, that the processing means, G, in Hamel pointed out by the Examiner does not teach, suggest or describe the cross-connect module of the Applicant's invention. With respect to the processing means, Hamel specifically recites:

"In addition to the processing means G, the network head T comprises two lasers LT1 and LT2 which emit respectively at the wavelengths  $\lambda_1$  and  $\lambda_2$  and which are controlled by the processing means G.

Each of these lasers LT1 and LT2 receives information (STM-1) in electrical form from the means G and converts this information into optical form." (See Hamel, col. 8, lines 4-10).

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\*Sensors DF11 and DF21 are both pre-tuned on the frequency  $f_1$  whereas the sensors DF12 and DF22 are both pre-tuned on the frequency  $f_2$ .

Each of the sensors DF1i and DF2i, which is pre-tuned on the frequency  $f_i$ , where the index  $i$  takes the value 1 or 2, supplies in output a voltage  $V_{si}$  which is:

at low level (0 V) if a signal at the frequency  $f_i$  is present at its input, or

at high level (5 V) if there is not a signal at this frequency  $f_i$  at its input.

This information concerning the presence or absence of frequency is transferred, by means of the corresponding control logic circuit CL1 or CL2, in a byte which is transmitted in the overhead of the signal sent to the network head T.

The processing means G read the overhead bytes. (See Hamel, col. 9, lines 46-61).

The function of the processing means, G, of Hamel as pointed out by the Examiner does not teach, suggest or describe the cross-connect module of the Applicant's invention for determining an output wavelength at which to transmit received signals based on address information included in the received signals.

Furthermore, as conceded by the Examiner, there is absolutely no teaching, suggestion or disclosure in Hamel for a tributary subsystem or multiplexing subsystem as claimed in at least the Applicant's claim 1 and taught in the Applicant's specification. The Examiner alleges, however that it would have been obvious to configure the tributary subsystem in the invention of Hamel as taught in the Applicant's invention. The Applicant respectfully disagrees.

The invention of the Applicant takes advantage of a novel proposed cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals. In Hamel there is no such cross-connect module. As such, if the tributary subsystem of Hamel were configured to conform to the tributary subsystem as taught in the Applicant's invention, the invention of Hamel would have no way to direct information to appropriate tributaries because of the lack of a cross-connect module as taught and claimed by the Applicant, or

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because of the lack of any other means of directing the information to the appropriate tributaries. As such, the Applicant strongly submits that Hamel teaches away from using a tributary subsystem as taught and claimed by the Applicant and as such it would not have been obvious to configure the tributary subsystem of Hamel to conform to the tributary subsystem of the Applicant's invention. Furthermore, all of the References cited by the Examiner and still yet all of the prior art discovered by the Applicant, depict a tributary subsystem connected to a single device as taught in Hamel and do not teach, suggest or describe a tributary subsystem configured to be coupled to pluralities of device to enable the devices to communicate over a ring as taught and claimed by the Applicant's invention. The Applicant respectfully invites the Examiner to cite to prior art references teaching, suggesting or describing a tributary subsystem as taught and claimed by the Applicant.

As such, and for at least the reasons stated above, the Applicant respectfully submits that the teachings of Hamel alone, do not teach, suggest or describe the invention of the Applicant at least with respect to claim 1.

Furthermore and as conceded by the Examiner, the teachings of neither Hamel nor Armitage, nor Sharma, individually teach, suggest or disclose the invention of the Applicant, at least with respect to independent claim 1.

More specifically, the teachings of Armitage for network protection using a WDM infrastructure fail to teach the invention of the Applicant. Specifically Armitage teaches a backbone WDM photonic network consisting of optical cross-connect nodes interconnected by optical bidirectional links. In Armitage each node is capable of routing any incoming wavelength channel on any of the incoming fibers to any wavelength channel on any of the outgoing fibers. This is in contrast to the Applicant's invention wherein nodes only communicate with each other via a head end node such that each terminal node has available to it the full bandwidth for its operating bandwidth.

The Examiner in his rejection of at least claim 1 cited the cross-connect nodes of Armitage for teaching the cross-connect module of the Applicant's invention. The Applicant respectfully submits that the cross-connect nodes of



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Armitage do not teach, suggest or describe the cross-connect module of the Applicant's invention. Specifically, the cross-connect nodes of Armitage do not teach or suggest the cross-connect module of the head-end of the Applicant's invention which determines an output wavelength at which to transmit received signals based on address information contained in the received signals. In addition, the cross-connect module of the Applicant's invention is contained in the head-end and not configured as a cross-connect node as in Armitage. These two concepts are in direct opposition. In addition, the teachings of Armitage fail to teach, suggest or describe a method and system of communication as taught and claimed by the Applicant. Specifically, Armitage fails to teach, suggest or describe a first node, a second node and a head-end and all of the components included in the first node, the second node and the head-end as taught and claimed by the Applicant. As such, the Applicant respectfully submits that Armitage alone fails to teach, suggest or describe the invention of the Applicant, at least with respect to claim 1.

In addition, the Applicant submits that the teachings of Sharma alone also fail to teach, suggest or describe the invention of the Applicant. More specifically, the teaching of Sharma for an optical wavelength division multiplexed network system which permits communication between any of a plurality of nodes via a main trunk line constructed by interconnecting the nodes by use of an optical fiber in a ring form (See Sharma, Abstract) fails to teach, suggest or describe the invention of the Applicant at least with respect to claim 1.

Sharma fails to teach or suggest that nodes only communicate with each other via a head end node such that each terminal node has available to it the full bandwidth for its operating bandwidth as taught and claimed by the Applicant. Even further, the teachings of Sharma fail to teach, suggest or describe a method and system of communication as taught and claimed by the Applicant. Specifically, Sharma fails to teach, suggest or describe a first node, a second node and a head-end and all of the components included in the first node, the second node and the head-end as taught and claimed by

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the Applicant. As such, the Applicant respectfully submits that Sharma alone fails to teach, suggest or describe the invention of the Applicant, at least with respect to claim 1.

In addition, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage or Sharma for the combination of the references to attempt to teach the invention of the Applicant.

For prior art reference to be combined to render obvious a subsequent invention under 35 U.S.C. § 103, there must be something in the prior art as a whole which suggests the desirability, and thus the obviousness, of making the combination. Uniroyal v. Rudkin-Wiley, 5 U.S.P.SQ.2d 1434, 1438 (Fed. Cir. 1988). The teachings of the references can be combined only if there is some suggestion or incentive in the prior art to do so. In re Fine, 5 U.S.P.SQ.2d 1596, 1599 (Fed. Cir. 1988). Hindsight is strictly forbidden. It is impermissible to use the claims as a framework to pick and choose among individual references to recreate the claimed invention Id. at 1600; W.L. Gore Associates, Inc., v. Garlock, Inc., 220 U.S.P.Q. 303, 312 (Fed. Cir. 1983).

Moreover, the mere fact that a prior art structure could be modified to produce the claimed invention would not have made the modification obvious unless the prior art suggested the desirability of the modification. In re Fritch, 23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992); In re Gordon, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Armitage and Sharma fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1, and the teachings and invention of Hamel for at least the reasons described above. That is, the teachings of Hamel, Armitage and Sharma alone or in any allowable combination fail to teach at least a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that

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determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

More specifically, In contrast to the invention of the Applicant, the invention and teachings of Hamel, Armitage and Sharma are directed to systems which permit direct intercommunication between any of a plurality of nodes.

As such and for at least the reasons described above, the Applicant respectfully submits that the surveillance system of Hamel does not render obvious the virtual star network of the present invention. Furthermore, the Applicant respectfully submits that the teachings of Armitage and Sharma fail to bridge the substantial gap between Hamel and the invention of the Applicant. As such, the Applicant respectfully submits that the teachings of Hamel, Armitage and Sharma, alone, or in any suggested or allowable combination (if any did exist, which the Applicant submits that none does) do not render at least the Applicant's independent claim 1 obvious.

Therefore, the Applicant submits that claim 1 as it now stands, fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

Likewise, independent claim 22 recites similar relevant features as recited in claim 1. As such, and for at least the reasons stated herein, the Applicant submits that independent claim 22, as it now stands, also fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

Furthermore, dependent claims 2, 4-7 and 11 depend either directly or indirectly from independent claim 1 and recite additional features therefor. As such and for at least the reasons set forth herein, the Applicant submits that none of these claims is obvious with respect to the teachings of Hamel, Armitage and Sharma. Therefore the Applicant submits that dependent claims 2, 4-7 and 11 also fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

The Applicant reserves the right to establish the patentability of each of the claims individually in subsequent prosecution.

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B. 35 U.S.C. § 103

The Examiner rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Hamel in view of Armitage and Sharma as applied to claim 1 above, and further in view of Jahromi (U.S. Patent No. 5,416,768). The rejection is respectfully traversed.

Claim 3 depends directly from independent claim 1 and recites further limitations thereof. The Examiner applied Hamel, Armitage and Sharma to claim 3 as described above for the Examiner's rejection of claim 1. The Examiner alleges that the differences between Hamel, Armitage and Sharma and claim 3 is that Hamel, Armitage and Sharma fail to teach that the head-end node includes a tributary subsystem configured to be coupled to a plurality of devices to enable the devices to communicate over the ring network. As such the Examiner cites Jahromi for alleging the teaching of such a tributary subsystem. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage and Sharma, alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1.

In addition, the teachings of Jahromi alone, for a digital cross-connection apparatus for use in interconnecting first and second communications networks (See Jahromi, Abstract), fail to teach, suggest or describe the Applicant's invention at least with regard to independent claim 1. Specifically, the digital cross-connection apparatus of Jahromi does not teach at least a head-end having an integral cross-connect module to determine an output wavelength at which to transmit received signals based on address information included in the received signals. Even further, the teachings of Jahromi alone fail to teach a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address

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information included in the received signals as claimed by at least the Applicant's claim 1.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma or Jahromi for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Jahromi fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1 and the teachings and invention of Hamel, Armitage and Sharma. More specifically, the Jahromi fails to teach at least a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma and Jahromi, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's independent claim 1 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma and Jahromi, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 as discussed above, the teachings of Hamel, Armitage, Sharma and Jahromi also do not teach, suggest, or describe the invention of the Applicant regarding dependent claim 3, which depends from independent claim 1, and do not render the Applicant's claim 3 obvious.

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Therefore, the Applicant submits that claim 3 as it now stands, fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

C. 35 U.S.C. § 103

The Examiner rejected claims 8, 17-19 and 21 under 35 U.S.C. § 103(a) as being unpatentable over Hamel in view of Armitage and Sharma as applied to claim 1 and claim 5 above, and further in view of Dumortier ("Toward a new IP over ATM routing paradigm"). The rejection is respectfully traversed.

**CLAIM 8**

Claim 8 depends indirectly from independent claim 1 and recites further limitations thereof. The Examiner applied Hamel, Armitage and Sharma to claim 8 as described above for the Examiner's rejection of claim 1. The Examiner alleges that the differences between Hamel, Armitage and Sharma and claim 8 is that Hamel, Armitage and Sharma fail to teach that the communication protocol is IP encapsulated within ATM. As such the Examiner cites Dumortier for alleging the teaching of such a communication protocol. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage and Sharma, alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1. In addition, the teachings of Dumortier alone, for an IP over ATM routing paradigm (See Dumortier, Abstract), do not anticipate or render obvious the Applicant's invention at least with regard to independent claim 1 directed in part to a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to

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transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma or Dumortier for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Dumortier fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1 and the teachings and invention of Hamel, Armitage and Sharma. More specifically, Dumortier fails to teach at least a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma and Dumortier, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's independent claim 1 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma and Dumortier, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 as discussed above, the Applicant submits that the teachings of Hamel, Armitage, Sharma and Dumortier also do not teach, suggest, or describe the invention of the Applicant regarding dependent claim 8, which depends indirectly from independent claim 1, and do not render the Applicant's claim 8 obvious.

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Therefore, the Applicant submits that claim 8 as it now stands, fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

**CLAIMS 17-19 and 21**

Regarding claims 17-19 and 21 the Examiner alleges that claims 17-19 and 21 correspond largely to coherent combinations of the limitations in system claims 1 and 5-8. As such, the Examiner alleges that because the teachings of Hamel in view of Armitage and Sharma and further in view of Dumortier make obvious the claims 1 and 5-8, the teachings of Hamel in view of Armitage and Sharma and further in view of Dumortier also make obvious the claims of 17-19 and 21. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage and Sharma, alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1 and dependent claims 5-7. In addition, the teachings of Dumortier alone, for an IP over ATM routing paradigm (See Dumortier, Abstract), do not anticipate or render obvious the Applicant's invention at least with regard to independent claim 1 directed, at least in part, to a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1 and further with regard to dependent claims 5-8.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma or Dumortier for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Dumortier fail to bridge the substantial gap between the



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Applicant's invention, at least with regard to independent claim 1 and dependent claims 5-8 and the teachings and invention of Hamel, Armitage and Sharma at least as described above.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma and Dumortier, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's independent claim 1 and dependent claims 5-8 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma and Dumortier, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 and claims 5-8 as discussed above, the Applicant submits that the teachings of Hamel, Armitage, Sharma and Dumortier also do not teach, suggest, or describe the invention of the Applicant regarding claims 17-19 and 21 which correspond largely to combinations of the limitations in system claims 1 and 5-8 as alleged by the Examiner.

Therefore, the Applicant submits that claims 17-19 and 21 as they now stand, fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

**D. 35 U.S.C. § 103**

The Examiner rejected claims 9-10 and 17-20 under 35 U.S.C. § 103(a) as being unpatentable over Hamel in view of Armitage and Sharma as applied to claim 1 above, and further in view of Lea (U.S. Patent No. 6,115,373). The rejection is respectfully traversed.

**CLAIMS 9-10**

Claims 9-10 depend indirectly from independent claim 1 and recite further limitations thereof. The Examiner applied Hamel, Armitage and Sharma to claims 9-10 as described above for the Examiner's rejection of claim 1. The Examiner alleges that the differences between Hamel, Armitage and Sharma and claims 9-10 is that Hamel, Armitage and Sharma fail to teach

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the second set of protocol-related limitations of claims 9-10. As such the Examiner cites Lea for alleging the teaching of such protocol-related limitations. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage and Sharma, alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1. In addition, the teachings of Lea alone, for an information network architecture that can handle both ATM and IP traffic employing unbuffered switches employing a system of priority (See Lea, Abstract), do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1 directed, at least in part, to a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma or Lea for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Lea fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1 and the teachings and invention of Hamel, Armitage and Sharma. More specifically, Lea fails to teach or suggest at least a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address

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information included in the received signals as claimed by at least the Applicant's claim 1.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma and Lea, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's independent claim 1 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma and Lea, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 as discussed above, the Applicant submits that the teachings of Hamel, Armitage, Sharma and Lea also do not teach, suggest, or describe the invention of the Applicant regarding dependent claims 9-10, which depend either directly or indirectly from independent claim 1, and do not render the Applicant's claims 9-10 obvious.

Therefore, the Applicant submits that claims 9-10 as they now stand, fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

#### **CLAIMS 17-20**

Regarding claims 17-20 the Examiner alleges that claims 17-20 correspond largely to coherent combinations of the limitations in system claims 1 and 9-10. As such, the Examiner alleges that because the teachings of Hamel in view of Armitage and Sharma and further in view of Lea make obvious the claims 1 and 9-10, the teachings of Hamel in view of Armitage and Sharma and further in view of Lea also make obvious the claims of 17-20. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage and Sharma, alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1 and dependent claims 9-10. In addition, the teachings of Lea alone, for an information network architecture that can handle both ATM and IP traffic employing unbuffered switches employing a system of priority (See Lea, Abstract), do not anticipate or render obvious the Applicant's invention at least

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with regard to independent claim 1 directed, at least in part, to a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1 and further with regard to dependent claims 9-10.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma or Lea for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Lea fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1 and dependent claims 9-10 and the teachings and invention of Hamel, Armitage and Sharma at least as described above.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma and Lea, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's independent claim 1 and dependent claims 9-10 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma and Lea, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 and claims 9-10 as discussed above, the Applicant submits that the teachings of Hamel, Armitage, Sharma and Lea also do not teach, suggest, or describe the invention of the Applicant regarding claims 17-20 which correspond largely to combinations of the limitations in system claims 1 and 9-10 as alleged by the Examiner.

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Therefore, the Applicant submits that claims 17-20 as they now stand, fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

E. 35 U.S.C. § 103

The Examiner rejected claims 12-13 under 35 U.S.C. § 103(a) as being unpatentable over Hamel in view of Armitage and Sharma as applied to claim 1 above, and further in view of Elrefaie ("Multiwavelength Survivable Ring Network Architecture"). The rejection is respectfully traversed.

Claims 12-13 depend either directly or indirectly from independent claim 1 and recite further limitations thereof. The Examiner applied Hamel, Armitage and Sharma to claims 12-13 as described above for the Examiner's rejection of claim 1. The Examiner alleges that the differences between Hamel, Armitage and Sharma and claims 12-13 is that Hamel, Armitage and Sharma fail to teach that the multiplexer comprising a pair of multiplexers coupled to the first and second rings, respectively. As such the Examiner cites Elrefaie for alleging the teaching of such a pair of multiplexers. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage and Sharma, alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1. In addition, the teachings of Elrefaie alone, for a new architecture for implementing unidirectional and bi-directional self-healing interoffice ring networks using WDM technology for growth (See Elrefaie, Abstract), do not anticipate or render obvious the Applicant's invention at least with regard to independent claim 1 directed, at least in part, to a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address

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information included in the received signals as claimed by at least the Applicant's claim 1.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma or Elrefaie for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Elrefaie fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1 and the teachings and invention of Hamel, Armitage and Sharma. More specifically, Elrefaie fails to teach or suggest at least a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma and Elrefaie, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's Independent claim 1 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma and Elrefaie, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 as discussed above, the Applicant submits that the teachings of Hamel, Armitage, Sharma and Elrefaie also do not teach, suggest, or describe the invention of the Applicant regarding dependent claims 12-13, which depend from independent claim 1, and do not render the Applicant's claims 12-13 obvious.

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Therefore, the Applicant submits that claims 12-13 as they now stand, fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

**F. 35 U.S.C. § 103**

The Examiner rejected claims 14-16 under 35 U.S.C. § 103(a) as being unpatentable over Hamel in view of Armitage and Sharma as applied to claim 1 above, and further in view of Elrefaie as applied to claim 12 above, and still further in view of Wu et al.. The rejection is respectfully traversed.

**CLAIM 14**

Claim 14 depends indirectly from independent claim 1 and directly from dependent claim 12 and recites further limitations thereof. The Examiner applied Hamel, Armitage, Sharma and Elrefaie to claim 14 as described above for the Examiner's rejection of claim 12. The Examiner alleges that the differences between Hamel, Armitage, Sharma and Elrefaie and claim 14 is that Hamel, Armitage, and Elrefaie fail to teach that the head-end node further includes a selector that compares a pair of signals received by the pair of demultiplexers and selects a signal from the pair of signals based on a quality parameter of each signal. As such the Examiner cites Wu for alleging the teaching of such a selector. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage, Sharma and Elrefaie, alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1 or dependent claim 12. In addition, the teachings of Wu alone, for using a SONET SHR architecture in future survivable interoffice fiber networks (See Wu, Abstract), do not anticipate or render obvious the Applicant's invention at least with regard to independent claim 1 directed, at least in part, to a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth

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for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma, Elrefaie or Wu for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Wu fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1 and dependent claim 12 and the teachings and invention of Hamel, Armitage, Sharma and Elrefaie. More specifically, Wu fails to teach or suggest at least a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma, Elrefaie and Wu, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's independent claim 1 or dependent claim 12 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma, Elrefaie and Wu, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 and claim 12 as discussed above, the Applicant submits that the teachings of Hamel, Armitage, Sharma, Elrefaie and Wu also do not teach, suggest, or describe the invention of the Applicant regarding dependent claim 14, which



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depends directly from claim 12 and indirectly from independent claim 1, and do not render the Applicant's claim 14 obvious.

Therefore, the Applicant submits that claim 14 as it now stands, fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

#### **CLAIMS 15-16**

Regarding claims 15-16 the Examiner alleges that claims 15-16 correspond largely to coherent combinations of the limitations in system claims 1 and 12-14. As such, the Examiner alleges that because the teachings of Hamel in view of Armitage and Sharma and in view of Elrefaie and further in view of Wu make obvious the claims 1 and 12-14, the teachings of Hamel in view of Armitage and Sharma and in view of Elrefald and further in view of Wu also make obvious the claims of 15-16. The Applicant respectfully disagrees.

As described above, the teachings of Hamel, Armitage, Sharma, and Elrefaie alone, or in any allowable combination do not teach, suggest or describe the Applicant's invention at least with regard to independent claim 1 and dependent claims 12-14. In addition, the teachings of Wu alone, for using a SONET SHR architecture in future survivable interoffice fiber networks (See Wu, Abstract), do not anticipate or render obvious the Applicant's invention at least with regard to independent claim 1 directed, at least in part, to a method and communication system wherein terminal nodes communicate with each other only through a head-end node via respective separate communication channels such that each terminal node has available to it the full bandwidth for its operating bandwidth and for a head-end node having a cross-connect module that determines an output wavelength at which to transmit received signals based on address information included in the received signals as claimed by at least the Applicant's claim 1 and further with regard to dependent claims 12-14.

Furthermore, the Applicant submits that there is absolutely no motivation or suggestion in either Hamel, Armitage, Sharma, Elrefaie or Wu

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for the combination of the references to attempt to teach the invention of the Applicant.

The Applicant further submits that even if there was a motivation or suggestion to combine (which the Applicant maintains that there is not), the teachings of Wu fail to bridge the substantial gap between the Applicant's invention, at least with regard to independent claim 1 and dependent claims 12-14 and the teachings and invention of Hamel, Armitage, Sharma and Elrefaie at least as described above.

As such the Applicant submits that the teachings of Hamel, Armitage, Sharma, Elrefaie and Wu, alone or in any suggested or allowable combination (if any did exist) do not render at least the Applicant's independent claim 1 and dependent claims 12-14 obvious.

Therefore, at least because the teachings of Hamel, Armitage, Sharma, Elrefaid and Wu, alone or in any allowable combination, do not teach, suggest, or describe the invention of the Applicant regarding at least claim 1 and claims 12-14 as discussed above, the Applicant submits that the teachings of Hamel, Armitage, Sharma, Elrefale and Wu also do not teach, suggest, or describe the invention of the Applicant regarding claims 15-16 which correspond largely to combinations of the limitations in system claims 1 and 12-14 as alleged by the Examiner.

Therefore, the Applicant submits that claims 15-16 as they now stand, fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

The Applicant reserves the right to establish the patentability of each of the claims individually in subsequent prosecution.

#### Conclusion

Thus, the Applicant submits that none of the claims presently in the application are obvious under the provisions of 35 U.S.C. § 103. Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

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If the Examiner believes that there are any unresolved issues requiring adverse action in any of the claims now pending in the application, it is requested that the Examiner telephone Jorge Tony Villabon, Esq. at (732) 530-9404 x 1131 or Eamon J. Wall, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,



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